# AC

### Framing (0:20)

#### The standard is maximizing expected well-being. Prefer Util:

#### 1) Actor specificity: Governments can only aggregate.

#### 2) Util is a lexical pre-requisite: A non-ideal framework is needed in order to have intuitive foundation to make decisions under duress.

#### 3) Weighability – Only Util can explain degrees of wrongness.

#### 4) Pain and pleasure motivate action – eg: I take my hand off a burning stove because of the pain

### The Advantage is Mining (2:20)

#### First, Asteroid mining coming now, BUT international regulations key to make it scalable

Jolene Creighton 16, founding editor of Futurism, “Why Asteroid Mining Could Dictate Our Entire Future in Space,” Science Alert, 7/1/16, https://www.sciencealert.com/how-asteroid-mining-might-dictate-our-future-in-space

As Earth’s population continues to swell, the strain on our planet’s resources continues to grow. And although ecologists assert that we aren’t at the tipping point just yet, Earth has a finite amount of resources. Eventually, we are going to run out, so it makes sense to start planning for that inevitability now. One of the most promising avenues? Space. Asteroid mining is an endeavour that aims to acquire natural resources from comets, asteroids, and minor planetary bodies in our solar system. In invokes images of Bruce Willis and Ben Affleck (two of the most well know asteroid miners from cinema); however, asteroid mining isn’t just the stuff of science fiction. In fact, asteroid mining is quickly becoming a reality, and with good reason. According to NASA, the mineral wealth that can be found in the asteroid belt (the region of space that exists between the orbits of Mars and Jupiter) equals out to the equivalent of just about 100 billion dollars for every person on Earth today. That’s a lot of wealth, but more importantly, that’s a lot of resources - and resources (not monetary gains) is really what space mining is all about. If you aren’t aware, getting materials from planet Earth to outer space takes an ..extravagant amount of fuel, and that means an extravagant amount of money. To that end, by acquiring raw materials from space itself, we could develop a host of space structures (such as colonies or space stations) and even generate rocket fuel, which will ultimately be needed if we ever hope to explore and colonise our solar system in a way that is economically viable. As Planetary Resources CEO Chris Lewicki asserts, "Whether it’s the air we breathe, the water we drink, the materials that we build things with, or ultimately, of course, the food that we eat…all of these things are available to us on this planet, but when we head into space, we have to bring all of it with us. That of course, isn’t very scalable." NASA states that, in the 21st century, space exploration will be reliant upon what we can mine in the cosmos: "The metals and minerals found on asteroids will provide the raw materials for space structures, and comets will become the watering holes and gas stations for interplanetary spacecraft." A host of governmentsandprivate companiesarealready working on asteroid mining projects. Luxembourg recently established a €220 million fund for space mining projects; the United States signed the Commercial Space Launch Competitiveness Act into law (which recognizes the right of US citizens to own asteroid resources); and private companies like Planetary Resources and Deep Space Industries have a number of technologies in production to help humanity mine the cosmos. But how long will it really take us to get there? Asteroid mining: a timeline Of course, there is a difference between passing laws and working on technology and actually having a functioning mining operation. However, Lewicki notes that such operations really aren’t that far away. "People think that this is something that will be a century away, or maybe something that their grandkids might see," Lewicki asserts, "but people already doing this. We already have two spacecraftin orbit around asteroids, and in the first half of the 2020s, we anticipate that we will [Planetary Resources will] be touching on the surface of the nearest asteroid and extracting the first really demonstrable amount of asteroid resources onsite." That’s 10 years away…just ten years until we’re mining our first asteroid. Of course, there are a lot of things that need to happen in order for this 10-year timeframe to be met, but we are well on our way. The first concern is establishing clear regulations regarding asteroid mining. For example, who really owns asteroids, anyways? Can anyone just venture space with a flag and stake a claim?

#### Three internal links:

#### Legal uncertainty makes resource distribution impossible due to international tensions – Davies 16

Rob Davies 16, reporter for the Guardian, citing space law expert Dr Chris Newman of the University of Sunderland and US lawyer Michael Listner, who founded thinktank Space Law and Policy Solutions, “Asteroid mining could be space’s new frontier: the problem is doing it legally,” The Guardian, 2/6/16, https://www.theguardian.com/business/2016/feb/06/asteroid-mining-space-minerals-legal-issues

When Buzz Aldrin and Neil Armstrong hoisted the Stars and Stripes on the moon, the act was purely symbolic. Two years earlier, mindful of Cold War animosity, the 1967 Outer Space Treaty (OST) had decreed that outer space, including the moon and other celestial bodies, “is not subject to national appropriation by claim of sovereignty”. In other words no country, not even the US, could own the moon or any other part of space, regardless of how many flags they erected there. Half a century on, though, the OST could prove the biggest obstacle toone of the most exciting new frontiers of space exploration: asteroid mining. The reason lawyers could soon be poring over that 48-year-old document is that space mining could become a reality within a couple of decades. In what is being seen as a major breakthrough for this embryonic technology, the government of Luxembourg has thrown its financial muscle behind plans to extract resources from asteroids, some of which are rich in platinum and other valuable metals. It plans to team up with private companies to help speed the progress of the industry and draw up a regulatory framework for it. One such firm, Deep Space Industries, wants to send small satellites, called Fireflies, into space from 2017 to prospect for minerals and ice. The satellites would hitch a ride on a rocket, and larger craft would then be used to harvest, transport and store raw materials. Metals such as nickel and iron, which are plentiful on Earth, could be processed while in orbit and used to build equipment or spacecraft. And it may eventually be possible to extract valuable minerals from asteroids cheaply enough for it to be worth bringing them back to Earth. Rival Planetary Resources has a slightly different plan, in which telescopes would be used to analyse asteroids before craft were sent to mine them. Its backers include Google co-founder Larry Page and billionaire businessman Ross Perot, and it thinks it could be operating in space by 2025. One of the difficulties facing these would-be space miners is cost, which is fittingly astronomical. Nasa’s Osiris-Rex expedition, which aims to bring just two kilos of asteroid material back to Earth by 2023, is set to cost $1bn. But Deep Space Industries thinks it can get the ball rolling by putting three of its Fireflies in space for just $20m. The other obvious barrier is the technological progress that is still required if commercial asteroid mining is to become practically possible and economically viable. However, considerable as these hurdles are, experts believe the legal component is the most pressing. Late last year, the US government made an attempt to update the law on space mining, producing a bill that allows companies to “possess, own, transport, use, and sell” extra-terrestrial resources without violating US law. The problem is that putting this into practice violates the OST. “The way a private company would enforce their right to mine is through a national court,” says space law expert Dr Chris Newman of the University of Sunderland. “In making a ruling, that court would exercise sovereign rights, contravening the OST. We will only know how this would play out if it is tested in court.” US lawyer Michael Listner, who founded thinktank Space Law and Policy Solutions, says the US law is incompatible with the OST and risks souring international relations**:** “China and Russia will want in. If you have conflicts of law, things start getting dicey and that could lead to legal and political conflict.” Newman believes that one reason why Luxembourg has included plans for drawing up a regulatory framework is to show the world that work is under way on untangling such legal knots. “This is something for investors to hang their hat on,” he says, “to give them confidence and say that there is a nascent legal framework.” But Dr Gbenga Oduntan, a space law expert at the University of Kent, warns that the international community needs to get its act together quickly. “What we don’t want is a free-for-all over asteroids,” he says. “We need to come together and do that thinking, because the law we have right now does not allow us to repatriate resources for commercial purposes.”

#### Competing claims over resources wreck government projects

Paul B. Larsen 13, taught air and space law for more than 40 years respectively at Southern Methodist University and at Georgetown University, “ASTEROID LEGAL REGIME: TIME FOR A CHANGE?,” Journal of Space Law 39 J. Space L. (2013-2014), https://heinonline.org/HOL/Page?handle=hein.journals/jrlsl39&div=19&g\_sent=1&casa\_token=&collection=journals

A. The Option of Continuing the Status Quo until Objections are Raised. At the present time, there is no special coordinated regime for asteroids. COPUOS is seeking to orchestrate an international network of stations to track NEOs in order to warn of dangerous asteroids that may cause disasters on Earth. NASA aims to locate 90% of the most dangerous NEOs (over 140 meters in diameter). 109 The European Union, individual countries, as well as private parties are also tracking dangerous asteroids. 110 Tracking of asteroids may lead to intervention but COPUOS has not faced that issue yet. Several countries and private groups are weighing a variety of unilateral asteroid diversion options such as kinetic impact, gravity tractor, or nuclear explosions.11 1 However, unilateral NEO diversion from one country or continent may result in disastrous damage in another country or continent and may thus be subject to strong objections. International coordination of NEO diversion will evidently be necessary, particularly because intervention with the asteroid will take place in non-sovereign outer space. NASA's plan to capture an asteroid and bring it into lunar orbit for closer examination by astronauts has considerable international interest.112 The more participation there is by other spacefaring States**,** theless they are likely to contest the diversion of an asteroid's orbit. However**,** suppose the asteroid chosen by NASA is composed of gold or platinum, i.e. it is very valuable. Then, other countries might also claim this particular asteroid. It is quite possible that some private operator would claim such an asteroid as private property under national law. 113 NASA's plan could therefore easily be challenged unless totally agreed and coordinated internationally. The plans of commercial companies to mine valuable asteroids either in space or by dragging them down to Earth for exploitation might also succeed if unchallenged. In order to receive government protection, the company could apply for a license from its government pursuant to the Outer Space Treaty, Art, VI. For that purpose, there should be national regulation authorizing such a mining license. Furthermore, the licensing government would be subject to claims by other States which might issue an identical license in accordance with its treaty rights under the Outer Space Treaty. 114 Alternatively, an asteroid mining company might decide to seize a precious asteroid without a national license in which case other claimants might challenge the legal right of the company to the asteroid and its resources. 116 The company might also have to persuade a bank or financier to finance its venture and the bank would want assurance that the company could obtain clear title to the asteroid property. That assurance might be difficult to produce. Lack of clear title wouldendanger outside financing

#### Private appropriation causes dangerous space mining and deregulation globally

Edd Gent 20, freelance science and technology writer, “Space Mining Should Be a Global Project—But It's Not Starting Off That Way,” Singularity Hub, 10-12-2020, <https://singularityhub.com/2020/10/12/the-us-is-trying-to-hijack-space-mining-and-there-could-be-disastrous-consequences/>

Exploiting the resources of outer space might be key to the future expansion of the human species. But researchers argue that the US is trying to skew the game in its favor, with potentially disastrous consequences. The enormous cost of lifting material into space means that any serious effort to colonize the solar system will require us to rely on resources beyond our atmosphere. Water will be the new gold thanks to its crucial role in sustaining life, as well as the fact it can be split into hydrogen fuel and oxygen for breathing. Regolith found on the surface of rocky bodies like the moon and Mars will be a crucial building material, while some companies think it will eventually be profitable to extract precious metals and rare earth elements from asteroids and return them to Earth. But so far, there’s little in the way of regulation designed to govern how these activities should be managed. Now two Canadian researchers argue in a paper in Science that recent policy moves by the US are part of a concerted effort to refocus international space cooperationtowards short-term commercial interests, which could precipitate a “race to the bottom” that sabotages efforts to safely manage the development of space. Aaron Boley and Michael Byers at the University of British Columbia trace back the start of this push to the 2015 Commercial Space Launch Competitiveness Act, which gave US citizens and companies the right to own and sell space resources under US law. In April this year, President Trump doubled down with an executive order affirming the right to commercial space mining and explicitly rejecting the idea that space is a “global commons,” flying in the face of established international norms. Since then, NASA has announced that any countries wishing to partner on its forthcoming Artemis missions designed to establish a permanent human presence on the moon will have to sign bilateral agreements known as Artemis Accords. These agreements will enshrine the idea that commercial space mining will be governed by national laws rather than international ones, the authors write, and that companies can declare “safety zones” around their operations to exclude others. Speaking to Space.com Mike Gold, the acting associate administrator for NASA’s Office of International and Interagency Relations, disputes the authors’ characterization of the accords and says they are based on the internationally-recognized Outer Space Treaty. He says they don’t include agreement on national regulation of mining or companies’ rights to establish safety zones, though they do assert the right to extract and use space resources. But given that they’ve yet to be released or even finalized, it’s not clear how far these rights extend or how they are enshrined in the agreements. And the authors point out that the fact that they are being negotiated bilaterally means the US will be able to use its dominant position to push its interpretation of international law and its overtly commercial goals for space development. Space policy designed around the exploitation of resources holds many dangers, say the paper authors. For a start, loosely-regulated space mining could result in the destruction of deposits that could hold invaluable scientific information**.** It could also kick up dangerous amounts of lunar dust that can cause serious damage to space vehicles, increase the amount of space debris, or in a worst-case scenario, create meteorites that could threaten satellites or even impact Earth. By eschewing a multilateral approach to setting space policy**,** the US also opens the door to a free-for-all where every country makes up its own rule**s**. Russia is highly critical of the Artemis Accords process and China appears to be frozen out of it, suggesting that two major space powers will not be bound by the new rules. That potentially sets the scene for a race to the bottom, where countries compete to set the laxest rules for space mining to attract investment. The authors call on other nations to speak up and attempt to set rules through the UN Committee on the Peaceful Uses of Outer Space. Writing in The Conversation, Scott Shackelford from Indiana University suggests a good model could be the 1959 Antarctic Treaty, which froze territorial claims and reserved the continent for “peaceful purposes” and “scientific investigation.” But the momentum behind the US’ push might be difficult to overcome. Last month, the agency announced it would pay companies to excavate small amounts of regolith on the moon. Boley and Byers admit that if this went ahead and was not protested by other nations, it could set a precedent in international law that would be hard to overcome. For better or worse, it seems that US dominance in space exploration means it’s in the driver’s seat when it comes to setting the rules. As they say, to the victor go the spoils.

#### 4. Cooperation over an asteroid retrieval mission establishes norms governing space mining

Vidya Sagar Reddy Avuthu 17, Research Analyst at the Observer Research Foundation in New Delhi, “Commercial space mining: Economic and legal implications,” Observer Foundation Research, September 28 2017, https://www.orfonline.org/research/commercial-space-mining-economic-and-legal-implications/

Sputnik also resolved a dilemma confronting the US administration of President Eisenhower. The upper boundary of national airspace was extended to infinity and therefore the administration was concerned about violating other countries’ airspace as American satellites flew around the earth. The US was particularly concerned about the reaction from the Soviet Union. Sputnik caused panic and challenged American technological supremacy, but the US was encouraged by the fact that other states offered compliments to the Soviet Union instead of protesting violation of their airspace.[53] Sputnik had established airspace limitations and outer space as new, freely accessible global commons. This was achieved by a technological feat rather than consensus of states and is a guiding principle for the Radio Regulations or space treaties such as the OST. In fact, a group of equatorial countries comprising Venezuela, Colombia, Indonesia, etc., tried asserting sovereign claims over parts of the geostationary orbit but were unable to convince other states to oppose the norm.[54] Commercial space mining is about to unleash a new era in space history and a new industrial age in human history. Another “Sputnik moment” is what is required to convince states of the need to establish international norms governing space mining**.** Apreliminary mission that brings back space resources (at least a few grams) which are then commercially traded on earth, even for symbolic reasons, would establish a new set of norms as a fait accompli.

### Scenario 1 – Space Resources (1:30)

#### Asteroid mining solves mineral shortages, resource conflicts and fallout from terrestrial mining

Kevin MacWhorter 16, J.D. Candidate, William & Mary Law School, "Sustainable Mining: Incentivizing Asteroid Mining in the Name of Environmentalism", William & Mary Environmental Law and Policy Review, Vol 40, Issue 2, Article 11, https://scholarship.law.wm.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1653&context=wmelpr

In the next sixty years, scientists predict that certain elements crucial to modern industry such as platinum, zinc, copper, phosphorous, lead, gold, and indium could be exhausted on Earth. 12 Many of these have no synthetic alternative, unlike chemical elements such as oil or diamonds.13 Liquid-crystal display (LCD) televisions, cellphones, and laptops are among the various consumer technologies that use precious metals.14Further, green technologies including wind turbines, solar panels, and catalytic converters require these rare elements. 15 As demand rises for both types of technologies, and as reserves of rare metals fall, prices skyrocket.16 Demand for nonrenewable resources creates conflict, and consumerism in rich countries results in harsh labor treatment for poorer countries.17 In general, the mining industry is extremely destructive to Earth’s environment.18 In fact, depending on the method employed, mining can destroy entire ecosystems by polluting water sources and contributing to deforestation.19 It is by its nature an unsustainable practice, because it involves the extraction of a finite and non-renewable resource.20 Moreover, by extracting tiny amounts of metals from relatively large quantities of ore, the mining industry contributes the largest portion of solid wastes in the world.21 The Environmental Protection Agency (EPA) describes the industry as the source of more toxic and hazardous waste than any other industrial sector [in the United States], costing billions of dollars to address the public health and environmental threats to communities. 22 Poor regulations and oxymoronic corporate definitions of sustainability, however, make it unclear as to just how much waste the industry actually produces.23 Platinum provides an excellent case study of the issue, because it is an extremely rare and expensive metal—an ore expected to exist in vast quantities in asteroids.24 Further, production of platinum has increased sharply in the past sixty years in order to keep up with growing demand for use in new technologies.25 In fact, despite their high costs, platinum group metals are so useful that [one] of [four] industrial goods on Earth require them in production. 26 Scholars do not expect demand to slow any time soon.27 Among other technologies, industries use platinum in products such as catalytic converters, jewelry production, various catalysts for chemical processing, and hydrogen fuel cells.28 While there is no consensus on how far the Earth’s reserves of platinum will take humanity, many scientists agree that platinum ore reserves will deplete in a relatively short amount of time.29 With the rate of mining at an all-time high,30 it is increasingly clear that historical patterns of mineral resources and development cannot simply be assumed to continue unaltered into the future. 31 The platinum mining industry, however, has a strong incentive to increase its rate of extraction as profits grow with the rate of demand. Without any alternative, this destructive practice will continue into the future.32 So-called platinum-group metal (PGM) ores are mined through underground or open cut techniques.33 Due to these practices, all but a very small fraction of the mined platinum ore is disposed of as solid waste.34 The environmental consequences of platinum production are thus quite significant, but like the mining industry in general, the amount of waste is typically under-reported.35 While this is due to high production levels at the moment, those levels will only increase given the estimated future demand of platinum.36 In spite of the negative consequences, mining continues unabated because it is economically important to many areas.37 The future environmental costs provide a major challenge in creating a sustainable system. Relegating at least some mining companies to near-Earth asteroids would reduce the negative effects of future mining levels on Earth. The economic benefits of mining need not be sacrificed for the sake of the environment.38

#### Water scarcity worsened by global climate change and pollution from mining get closer to spiraling the world in a war to end all -

Daniel Darling 19, senior international military markets analyst at Forecast International Incorporated, an aerospace and defense consulting firm located in Newtown, Connecticut, where he covers the Europe and Asia-Pacific markets, “The Coming Wars over Water,” The National Interest, 4/14/19, https://nationalinterest.org/blog/buzz/coming-wars-over-water-52147

But another looming issue confronting global leaders involves the earth’s most precious resource: water.

In many regions of the globe—from Northern Africa to the Middle East to Central and South Asia—efforts to manage internal freshwater supplies or conserve transboundary water agreements are under strainas scarcity rises in parallel with population growth, consumption and warming temperatures.

A World Bank study on the global water picture in 2016 noted that entire regions may see their gross domestic product decline by up to 6 percent by 2050 due to water-related losses in agriculture, health, income and property. The areas highlighted consist of many of the world’s largest population concentrations, regions with developing economies, intensive and unsustainable agricultural practices and high occurrences of drought.

Dam-building and its downstream effects across national borders—as in the case of Ethiopia’s Grand Ethiopian Renaissance Dam and China’s water diversion project from the Yarlung Tsangpo River in southern Tibet—threaten to escalate tensions orredefine national claimsoverdisputed regions.

Such disputes could mushroom across the globein the face of broader demographic and resource shifts.

According to the Pacific Institute’s water conflict chronology database, eighteen water-related incidents occurred in 2018 alone, ranging from violence erupting at protests over water management to outright fighting between competing communities over access to water and herding rights.

These incidents appear destined to become more a norm than an outlier as water resources are consumed faster than rainfall replenishment in some areas and limitations exacerbate longstanding tensions, be they ethnic**,** tribalornational-based. Delicate tradeoff systems between nations located upstream and downstream of major rivers threaten to be undone by disruptions, as in the case of Central Asian countries sharing parts of the Fergana Valley.

In addition, scarcity issues may create internal security pressures by leading to radicalization amongst vulnerable population sectors.

With water a vital and finite resource, the world’s industrialized nations are naturally protective of local supply and place a premium on water security in instances where water flows across shared borders. When mixed with political disputes or rivalries, resource pressures may act as a catalyst for armed conflict.

Wars over water resources are not without precedent. The Six-Day War of 1967, for instance, was in part an Israeli military response to a Syrian attempt to dam the Yarmuk River, a tributary of the Jordan River, a crucial water source for Israel.

Another potential flashpoint exists in one of the world’s most tense arenas: the border between India and Pakistan. There the potential repudiation of a water-sharing agreement brokered by the World Bank in 1960, the Indus Waters Treaty, would serve to further damage relations between Pakistan and India, potentially sending the two rivals spiraling into a conflict that might draw in other nations.

The treaty remains in place despite two wars conducted over that time between the neighboring rivals. This is a credit to the cornerstone of the agreement: the rational self-interest of both signatories. With water at a premium for both, any war over it would threaten the supply of each actor, thus ostensibly negating the pretense for armed conflict.

But with Pakistan facing declining water availability and blaming its situation on India's “water terrorism,” the potential for crisis increases.

India, which plans for a presumptive “collusive threat” on both its northeast and northwest borders from China and Pakistan, must tread carefully in order to avoid reciprocity from Beijing should the latter turn its back on water rationality. While India holds an upstream riparian advantage over Pakistan in regards to the Sutlej, Beas and Ravi Rivers, so too does China as it relates to major rivers flowing into India from Tibet.

Considering Pakistan’s water vulnerability—which involves exploding population growth, poor water utilization and infrastructure maintenance, and unsustainable usage patterns—any threat by India to abrogate the treaty or maximize its use of water from any of the rivers covered under the IWT would be seen by Islamabad as tantamount to an act of war.

Factor in Pakistan’s strategic alignment with China and any outbreak of conflict might draw Beijing into the scrum, thereby resulting in India confronting the two-front war its planners most fear. Under this scenario, in which three nuclear-armed nationsconduct military operations at some level of intensity, the rest of the world would be left scrambling to mediate the crisis at zero hour.

#### Earth mining kills the world – extinction from nowhere to exist

Matthew S. Williams 19, writer at Universe Today, Aug 1 2019, "Asteroid Mining: What Will It Involve and Is This the Future of Wealth?", Interessting Engineering, https://interestingengineering.com/asteroid-mining-what-will-it-involve-and-is-this-the-future-of-wealth

Of course, this raises the obvious question: wouldn't it be really expensive to do all this mining? Why not simply continue to rely on Earth for sources of precious metals and resources and simply learn to use them better? To put it simply, we are running out of resources. To be clear, learning to use our resources better and more sustainably is always a great idea. And while it is certainly true than Earth-based mining is far cheaper than going to space would be, that may not be the case indefinitely. Aside from the fact that off-world minerals and ices would be of considerable value to Earth's economy, there is also the way that growing consumption is leading our reserves to become slowly exhausted. In fact, according to some estimates, it is possible that our planet will run out of key elements that are needed for modern industry and food production within the next 50 to 60 years. This alone is a pretty good incentive to tap the virtually inexhaustible supply of elements located off-world. Plus, there are a lot of benefits to expanding humanity's resource base beyond Earth. Here on Earth, mining takes a considerable toll on the natural environment. In fact, depending on the methods used, it can result in erosion, sinkholes, habitat destruction, and the destruction of native animal and plant life. There's also the dangers of toxic runoff and the contamination of soil, groundwater, and surface water, which is a danger to humans, as well as to wildlife and the natural environment. As for smelting, machining, and manufacturing, the environmental damage that results is well-documented. Combined with power generation, these industrial processes are one of the leading contributors to air, water, and pollution. By shifting these burdens off-world, humanity could dramatically-reduce the impact it has on the natural environment.

### Scenario 2 – Space Militarization (1:25)

#### Unilateral asteroid mining ensures conflict over resources that escalates

Jon Kelvey 14, writer and journalist based in central Maryland, citing Joanne Gabrynowicz, a space lawyer and editor emeritus of the Journal of Space Law at the University of Mississippi School of Law, “Is It Legal to Mine Asteroids?,” Slate, 10/13/14, https://slate.com/technology/2014/10/asteroid-mining-and-space-law-who-gets-to-profit-from-outer-space-platinum.html

There’s gold in them thar skies, or at least some platinum and a substantial amount of water, according to hopeful space prospectors. Over the past several years, a few companies have announced plans to mine asteroids. If successful, they could reinvigorate earthbound industries with infusions of rare earth minerals. They could also catalyze a new phase of space exploration by creating orbiting caches of material to build spacecraft as well as water, which could fuel them. Even if these efforts fail, they could lead to new technologies and lower the cost of a rocket ride to orbit. Of course, there are technical challenges. A vast, radiation-filled vacuum separates the space entrepreneurs from the space rocks of their ambitions, and any actual mining is many years away and might fail. But the current crop of space entrepreneurs are far more credible than the cranks of yesteryear, people who might have sold plots of lunar real estate in the days before the Apollo missions. There are tech giants with proven track records, such as X Prize Founder Peter Diamandis, whose Planetary Resources boasts James Cameron as well as Google’s Larry Page and Eric Schmidt as investors. There is a real possibility that asteroid mining could become a reality within our lifetimes. That possibility raises some very interesting questions. First and foremost, it’s not entirely clear whether mining and selling asteroid stuff is even legal, which could really hamper the whole enterprise. Space is really big, and doing stuff there is really expensive. Even billionaires need additional investors for that sort of thing, and if you’re investing in a platinum mine in the sky, you want to know the miners actually have the rights to that platinum. The nascent asteroid mining industry is pushing the United States to pass legislation clarifying the matter since the United States has obligations to regulate its country’s private space activities under international law. If these mining ventures are successful, the world could see billions of dollars flowing down from space to American companies. Is there a system for dealing with any conflicts that asteroid mining will likely arouse? The historical record certainly suggests the possibility of bitter, even violent disputes. Just consider the Arctic. Impenetrable ice was once the foil for those who dreamed of a Northwest Passage, but global warming has made the oil- and natural-gas-rich Arctic seabed accessible for the first time, and there has been a rush to lay claims to territory. The United States and Canada have been making careful geological measurements in order to determine territorial boundaries. Russia has pursued a different path: In 2007, the country used a submersible to plant its flag on the seabed at the North Pole. It’s an example of how contested things can get even when there is a system of rules in place, according to Joanne Gabrynowicz, a space lawyer and editor emeritus of the Journal of Space Law at the University of Mississippi School of Law. There is a system of international governance in place for the Arctic, but she says it is being strained by the recent thaw because, “it’s so much easier to govern something when you can’t get to it.” If emerging space technologies can be thought of as melting Arctic ice, it might be time to start discussing some basic rules before everything thaws. This is what worries Gabrynowicz. Current efforts to clarify the legal status of asteroid-mined resources, if approached the wrong way, she says, couldguarantee Arctic-like international disputes over future space activities. The reverse is also a concern: Disagreements over space could influence disputes on Earth. It might be fun to imagine Battlestar Galactica–type conflicts over resources in space, but why spend millions on space weapons when you can hurt your competitor at home and on the cheap? The foundational document that governs doing stuff in space is the 1967 Outer Space Treaty, on which the United States, Russia, China, and more than 100 other countries are signatories. It reads with an optimism that seems strange today in the era of the mothballed space shuttle. The treaty bans nuclear weapons in space, forbids nations to make claims to celestial real estate, and clearly allows for private space enterprise. According to Gabrynowicz, “Non-state actors … are authorized to be in space, that’s what Article 6 of the Outer Space Treaty is all about.” In fact, it’s apparent that the drafters of the treaty expected that resources would be extracted from space at some point, she says, “But we’ve just never reached agreement on what happens to extracted resources. … So what is happening is you have companies that are chomping at the bit to clarify the rules.” On Sept. 10, the House Science, Space, and Technology Committee held a hearing on the Asteroid Act, a refreshingly short and readable five-page bill that would recognize the ownership by companies of resources they have extracted from asteroids and would also prohibit companies from interfering with the operations of competitors. Planetary Resources sent a letter to the committee in support of the bill. The Asteroid Act is not the way that Gabrynowicz would go, however, and she said as much at the congressional hearing. (She was the only space lawyer invited to testify among a group of scientists.) In her view, the bill fails to address basic issues, such as who would license and regulate asteroid mining operations, as well as larger issues, such as the legality of mining operations under international law. However Congress might decide to interpret the Outer Space Treaty, she says, failing to make sure other signatory nations are on the same page could lead to geopolitical consequences. If other space-faring nations interpret the Asteroid Act as the United States playing loose with the Outer Space Treaty, they might decide to do so themselves—and in unpredictable ways. China, for instance, has declared its intention to send humans to the moon, and hinted at possible mining operations. If China sees the United States as having already violated the terms of the Outer Space Treaty, what version of the rules will China be playing by in its own operations? “The point here is recognizing that it’s not just a matter of law,” Gabrynowicz says, “It’s a matter of political strategy.” Instead of giving asteroid mining a unilateral thumbs up at home, Gabrynowicz would begin building a new layer of international agreements, “You start with three to four countries and begin to reach some sort of agreement on what would happen to the extracted resources,” Gabrynowicz says. It’s a process that might take years, but that’s all the more reason to start now, before any real wealth or resources are actually being hauled through space. Others in the space law community disagree with Gabrynowicz. Brian Weeden is a technical adviser at the Secure World Foundation, a think tank focusing on strategies for peaceful uses of space. He doesn’t expect the sort of conflicts we see over resources on Earth to take place over resources in space, partly because there are vastly larger quantities of such valuables in asteroids than have ever been mined from our planet. He also believes that the Outer Space Treaty is already sufficient legal justification for asteroid mining and that waiting for an international consensus could drag on interminably. “I envision a process where the U.S. puts the regulatory framework in place in stages to match the staged development of the technology,” Weeden says. “As it progresses, I think the U.S. should engage in a dialogue with other space actors and the international community … if there’s an issue that crops up that highlights a particular shortcoming or hole in the international legal framework, then it should be addressed.” Weeden also points out that there is plenty of work to be done domestically before any actual space mining can occur. The United States has an obligation under international law to regulate the actions of commercial space companies, but no agency currently has that authority. The Federal Aviation Administration issues launch licenses and re-entry licenses, but there is no agency responsible for anything that happens in orbit or beyond. But both Gabrynowicz and Weeden seem to be thinking of international law in a fashion that is inherently negative, seeing the need for agreement as something necessary only to mitigate problems. Space law could be viewed as a positive. An opportunity, even. If U.S. policy toward space has the power to affect geopolitics on the ground, why not use that fact to our advantage? If the very discussion of asteroid mining has the power to influence, say, Russia’s behavior in the Arctic for the worse, couldn’t it also be used as influence for the better? And what about other countries with whom the United States has had communication breakdowns as of late? When a conversation turns dull or repetitious, change the topic to outer space. Gabrynowicz agreed after I posed the question to her in an email. “I do think there could be opportunities in speaking with other countries about asteroid mining,” she wrote. “In fact, since day one, space has always been about foreign policy. [President Kennedy] used Apollo to demonstrate the superiority of U.S. technology and to influence nonaligned nations; the Apollo-Soyuz Project of the ’70s was a demonstration of détente.” In the early 1990s, the Clinton administration used the International Space Station to keep the nuclear weapons of the former Soviet Union from falling into the wrong hands. In the chaos following the collapse of the USSR, the administration brought the Russians into the space station project because, Gabrynowicz said, “The people that were in charge of the nuclear materials and the rocketry were the rocket forces. Those were the same people that would have to make the decision on the space station,” and the strategy was to open a bona fide line of communication with the people in control of the bombs. It was a gamble, and none of the other ISS partners initially wanted the Russians involved, but it worked. Perhaps similar lines of communication could be opened with states that are nuclear hopefuls. Might a change in topic with Iran provide an opportunity to talk about their nuclear program, or at least give us more insight as to the peaceful or offense plans for their rockets? Or, to take an entirely different tack, maybe we could kick off a new, three-way space race between the United States, China, and Russia, one where we benefit from agreed upon codes of conduct as well as the driving force of competition. We might also direct focus away from the Arctic and the South China Sea and onto those near Earth asteroids. The political opportunities that could come from discussions with other nations about asteroid mining might be of more immediate value than anything the space entrepreneurs can do. It could be years, decades even before the platinum really starts flowing, if it ever happens. Political alliances forged over a discussion of asteroid mining can yield benefits today—benefits that could well persist even if the dreams of the miners never come to fruition.

#### Space war goes nuclear

Laura Grego 18, Senior Scientist in the Global Security Program at the Union of Concerned Scientists, Postdoctoral Researcher at the Harvard-Smithsonian Center for Astrophysics, PhD in Experimental Physics at the California Institute of Technology, Space and Crisis Stability, Union of Concerned Scientists, 3-19-18, <https://www.law.upenn.edu/live/files/7804-grego-space-and-crisis-stabilitypdf>

Why space is a particular problem for crisis stability For a number of reasons, space poses particular challenges in preventing a crisis from starting or from being managed well. Some of these are to do with the physical nature of space, such as the short timelines and difficulty of attribution inherent in space operations. Some are due to the way space is used, such as the entanglement of strategic and tactical missions and the prevalence of dual-use technologies. Some are due to the history of space, such the absence of a shared understanding of appropriate behaviors and consequences, and a dearth of stabilizing personal and institutional relationships. While some of these have terrestrial equivalents, taken together, they present a special challenge. The vulnerability of satellites and first strike incentives Satellites are inherently fragile and difficult to protect; in the language of strategic planners, space is an “offense-dominant” regime. This can lead to a number of pressures to strike first that don‘t exist for other, better-protected domains. Satellites travel on predictable orbits, and many pass repeatedly over all of the earth‘s nations. Low-earth orbiting satellites are reachable by missiles much less capable than those needed to launch satellites into orbit, as well as by directed energy which can interfere with sensors or with communications channels. Because launch mass is at a premium, satellite armor is impractical. Maneuvers on orbit need costly amounts of fuel, which has to be brought along on launch, limiting satellites‘ ability to move away from threats. And so, these very valuable satellites are also inherently vulnerable and may present as attractive targets. Thus, an actor with substantial dependence on space has an incentive to strike first if hostilities look probable, to ensure these valuable assets are not lost. Even if both (or all) sides in a conflict prefer not to engage in war, this weakness may provide an incentive to approach it closely anyway. A RAND Corporation monograph commissioned by the Air Force15 described the issue this way: First-strike stability is a concept that Glenn Kent and David Thaler developed in 1989 to examine the structural dynamics of mutual deterrence between two or more nuclear states.16 It is similar to crisis stability, which Charles Glaser described as ―a measure of the countries‘ incentives not to preempt in a crisis, that is, not to attack first in order to beat the attack of the enemy,‖17 except that it does not delve into the psychological factors present in specific crises. Rather, first strike stability focuses on each side‘s force posture and the balance of capabilities and vulnerabilities that could make a crisis unstable should a confrontation occur. For example, in the case of the United States, the fact that conventional weapons are so heavily dependent on vulnerable satellites may create incentives for the US to strike first terrestrially in the lead up to a confrontation, before its space-derived advantages are eroded by anti-satellite attacks.18 Indeed, any actor for which satellites or space-based weapons are an important part of its military posture, whether for support missions or on-orbit weapons, will feel “use it or lose it” pressure because of the inherent vulnerability of satellites. Short timelines and difficulty of attribution The compressed timelines characteristic of crises combine with these “use it or lose it” pressures to shrink timelines. This dynamic couples dangerously with the inherent difficulty of determining the causes of satellite degradation, whether malicious or from natural causes, in a timely way. Space is a difficult environment in which to operate. Satellites orbit amidst increasing amounts of debris. A collision with a debris object the size of a marble could be catastrophic for a satellite, but objects of that size cannot be reliably tracked. So a failure due to a collision with a small piece of untracked debris may be left open to other interpretations. Satellite electronics are also subject to high levels of damaging radiation. Because of their remoteness, satellites as a rule cannot be repaired or maintained. While on-board diagnostics and space surveillance can help the user understand what went wrong, it is difficult to have a complete picture on short timescales. Satellite failure on-orbit is a regular occurrence19 (indeed, many satellites are kept in service long past their intended lifetimes). In the past, when fewer actors had access to satellite-disrupting technologies, satellite failures were usually ascribed to “natural” causes. But increasingly, even during times of peace operators may assume malicious intent. More to the point, in a crisis when the costs of inaction may be perceived to be costly, there is an incentive to choose the worst-case interpretation of events even if the information is incomplete or inconclusive. Entanglement of strategic and tactical missions During the Cold War, nuclear and conventional arms were well separated, and escalation pathways were relatively clear. While space-based assets performed critical strategic missions, including early warning of ballistic missile launch and secure communications in a crisis, there was a relatively clear sense that these targets were off limits, as attacks could undermine nuclear deterrence. In the Strategic Arms Limitation Treaty, the US and Soviet Union pledged not to interfere with each other‘s ―national technical means‖ of verifying compliance with the agreement, yet another recognition that attacking strategically important satellites could be destabilizing.20 There was also restraint in building the hardware that could hold these assets at risk. However, where the lines between strategic satellite missions and other missions are blurred, these norms can be weakened. For example, the satellites that provide early warning of ballistic missile launch are associated with nuclear deterrent posture, but also are critical sensors for missile defenses. Strategic surveillance and missile warning satellites also support efforts to locate and destroy mobile conventional missile launchers. Interfering with an early warning sensor satellite might be intended to dissuade an adversary from using nuclear weapons first by degrading their missile defenses and thus hindering their first-strike posture. However, for a state that uses early warning satellites to enable a “hair trigger” or launch-on-attack posture, the interference with such a satellite might instead be interpreted as a precursor to a nuclear attack. It may accelerate the use of nuclear weapons rather than inhibit it. Misperception and dual-use technologies Some space technologies and activities can be used both for relatively benign purposes but also for hostile ones. It may be difficult for an actor to understand the intent behind the development, testing, use, and stockpiling of these technologies, and see threats where there are none. (Or miss a threat until it is too late.) This may start a cycle of action and reaction based on misperception. For example, relatively low-mass satellites can now maneuver autonomously and closely approach other satellites without their cooperation; this may be for peaceful purposes such as satellite maintenance or the building of complex space structures, or for more controversial reasons such as intelligence-gathering or anti-satellite attacks. Ground-based lasers can be used to dazzle the sensors of an adversary‘s remote sensing satellites, and with sufficient power, they may damage those sensors. The power needed to dazzle a satellite is low, achievable with commercially available lasers coupled to a mirror which can track the satellite. Laser ranging networks use low-powered lasers to track satellites and to monitor precisely the Earth‘s shape and gravitational field, and use similar technologies. 21 Higher-powered lasers coupled with satellite-tracking optics have fewer legitimate uses. Because midcourse missile defense systems are intended to destroy long-range ballistic missile warheads, which travel at speeds and altitudes comparable to those of satellites, such defense systems also have inherent ASAT capabilities. In fact, while the technologies being developed for long-range missile defenses might not prove very effective against ballistic missiles—for example, because of the countermeasure problems associated with midcourse missile defense— they could be far more effective against satellites. This capacity is not just theoretical. In 2007, China demonstrated a direct-ascent anti-satellite capability which could be used both in an ASAT and missile defense role, and in 2009, the United States used a ship-based missile defense interceptor to destroy a satellite, as well. US plans indicated a projected inventory of missile defense interceptors with capability to reach all low earth orbiting satellites in the dozens in the 2020s, and in the hundreds by 2030.22 Discrimination The consequences of interfering with a satellite may be vastly different depending on who is affected and how, and whether the satellite represents a legitimate military objective. However, it will not always be clear who the owners and operators of a satellite are, and users of a satellite‘s services may be numerous and not public. Registration of satellites is incomplete23 and current ownership is not necessarily updated in a readily available repository. The identification of a satellite as military or civilian may be deliberately obscured. Or its value as a military asset may change over time; for example, the share of capacity of a commercial satellite used by military customers may wax and wane. A potential adversary‘s satellite may have different or additional missions that are more vital to that adversary than an outsider may perceive. An ASAT attack that creates persistent debris could result in significant collateral damage to a wide range of other actors; unlike terrestrial attacks, these consequences are not limited geographically, and could harm other users unpredictably. In 2015, the Pentagon‘s annual wargame, or simulated conflict, involving space assets focused on a future regional conflict. The official report out24 warned that it was hard to keep the conflict contained geographically when using anti-satellite weapons: As the wargame unfolded, a regional crisis quickly escalated, partly because of the interconnectedness of a multi-domain fight involving a capable adversary. The wargame participants emphasized the challenges in containing horizontal escalation once space control capabilities are employed to achieve limited national objectives. Lack of shared understanding of consequences/proportionality States have fairly similar understandings of the implications of military actions on the ground, in the air, and at sea, built over decades of experience. The United States and the Soviet Union/Russia have built some shared understanding of each other‘s strategic thinking on nuclear weapons, though this is less true for other states with nuclear weapons. But in the context of nuclear weapons, there is an arguable understanding about the crisis escalation based on the type of weapon (strategic or tactical) and the target (counterforce—against other nuclear targets, or countervalue—against civilian targets). Because of a lack of experience in hostilities that target space-based capabilities, it is not entirely clear what the proper response to a space activity is and where the escalation thresholds or “red lines” lie. Exacerbating this is the asymmetry in space investments; not all actors will assign the same value to a given target or same escalatory nature to different weapons.

#### Any nuclear war causes extinction – ice age and famine.

Steven Starr 15 [Director of the University of Missouri’s Clinical Laboratory Science Program, as well as a senior scientist at the [Physicians for Social Responsibility](http://www.psr.org/). He has worked with the Swiss, Chilean, and Swedish governments in support of their efforts at the United Nations to eliminate thousands of high-alert, launch-ready U.S. and Russian nuclear weapons. “Nuclear War: An Unrecognized Mass Extinction Event Waiting To Happen.” Ratical. March 2015. <https://ratical.org/radiation/NuclearExtinction/StevenStarr022815.html>] TG

A war fought with 21st century strategic nuclear weapons would be more than just a great catastrophe in human history. If we allow it to happen, such a war would be a mass extinction event that [ends human history](https://ratical.org/radiation/NuclearExtinction/StarrNuclearWinterOct09.pdf). There is a profound difference between extinction and “an unprecedented disaster,” or even “the end of civilization,” because even after such an immense catastrophe, human life would go on. But extinction, by definition, is an event of utter finality, and a nuclear war that could cause human extinction should really be considered as the ultimate criminal act. It certainly would be the crime to end all crimes. The world’s leading climatologists now tell us that nuclear war threatens our continued existence as a species. Their studies predict that a large nuclear war, especially one fought with strategic nuclear weapons, would create [a post-war environment in which for many years it would be too cold and dark to even grow food](http://climate.envsci.rutgers.edu/pdf/RobockToonSAD.pdf). Their findings make it clear that not only humans, but most large animals and many other forms of complex life would likely vanish forever in a nuclear darkness of our own making. The environmental consequences of nuclear war would attack the ecological support systems of life at every level. Radioactive fallout, produced not only by nuclear bombs, but also by the destruction of nuclear power plants and their spent fuel pools, would poison the biosphere. Millions of tons of smoke would act to [destroy Earth’s protective ozone layer](https://www2.ucar.edu/atmosnews/just-published/3995/nuclear-war-and-ultraviolet-radiation) and block most sunlight from reaching Earth’s surface, creating Ice Age weather conditions that would last for decades. Yet the political and military leaders who control nuclear weapons strictly avoid any direct public discussion of the consequences of nuclear war. They do so by arguing that nuclear weapons are not intended to be used, but only to deter. Remarkably, the leaders of the Nuclear Weapon States have chosen to ignore the authoritative, long-standing scientific research done by the climatologists, research that predicts virtually any nuclear war, fought with even a fraction of the operational and deployed nuclear arsenals, will leave the Earth essentially uninhabitable.

### Next is my advocacy (0:20)

#### States ought to ban the appropriation of outer space for mining activities by private entities.

#### Normal means is ratification of the Moon Treaty

**Mallick and Rajagopalan 19** [(Senjuti Mallick, graduated from ILS Law College, Pune, in 2016. She was a Law Researcher at the High Court of Delhi from 2016 to 2018 and is currently pursuing LL.M in International Law at The Fletcher School of Law and Diplomacy, USA. She has been doing research on Outer Space Law since she was a student at ILS. Presently, she is working on different aspects of Space Law, in particular, Space debris mitigation and removal, and the law of the commons. She has published articles on Space Law in the All India Reporter Law Journal and The Hindu.)( Dr Rajeswari (Raji) Pillai Rajagopalan is the Director of the Centre for Security, Strategy and Technology (CSST) at the Observer Research Foundation, New Delhi.  Dr Rajagopalan was the Technical Advisor to the United Nations Group of Governmental Experts (GGE) on Prevention of Arms Race in Outer Space (PAROS) (July 2018-July 2019).  She was also a Non-Resident Indo-Pacific Fellow at the Perth USAsia Centre from April-December 2020.  As a senior Asia defence writer for The Diplomat, she writes a weekly column on Asian strategic issues.) “If space is ‘the province of mankind’, who owns its resources?” Occasional Papers, January 24, 2019, https://www.orfonline.org/research/if-space-is-the-province-of-mankind-who-owns-its-resources-47561/]  
A third possible option is to get a larger global endorsement of the Moon Treaty, which highlights the common heritage of mankind. The Moon Treaty is important as it addresses a “loophole” of the OST “by banning any ownership of any extraterrestrial property by any organization or private person, unless that organization is international and governmental.”[[lxiv]](https://www.orfonline.org/research/if-space-is-the-province-of-mankind-who-owns-its-resources-47561/#_edn64) But the fact that it has been endorsed only by a handful of countries makes it a “failure” from the international law perspective.[[lxv]](https://www.orfonline.org/research/if-space-is-the-province-of-mankind-who-owns-its-resources-47561/#_edn65) Nevertheless, efforts must be made to strengthen the support base for the Moon Agreement given the potential pitfalls of resource extraction and space mining activities in outer space. Signatories to the Moon Treaty can take the lead within multilateral platforms such as the UN to debate the usefulness of the treaty in the changed context of technological advancements and new geopolitical dynamics, and potentially find compromises where there are disagreements.